

a spherical bearing interposed between said workpiece supporting and pressing member and said top ring drive shaft, said spherical bearing comprising spherical seats formed in said workpiece supporting and pressing member and in said top ring drive shaft, respectively, and a single sphere seated in said seats so as to allow said top ring to tilt upon changes in the inclination of said upper surface of said turntable, the radius of said sphere being substantially the same as the radius of curvature of each of said spherical seats.

2. The polishing apparatus according to claim 1, wherein said top ring has a plurality of suction holes connected to a vacuum source, whereby the workpiece is attachable to a lower surface of said top ring under a vacuum developed by said vacuum source.

3. The polishing apparatus according to claim 1, wherein said top ring comprises a porous plate connected to a vacuum source, whereby the workpiece is attachable to a lower surface of said porous plate under a vacuum developed by said vacuum source.

4. The polishing apparatus according to claim 1, and further comprising at least one first pin mounted on said top ring drive shaft and at least one second pin mounted on said top ring, said first pin and said second pin being held in point contact with each other such that torque from said top ring drive shaft is transmitted to said top ring via said pins.

5. A polishing apparatus for polishing a surface of a workpiece, comprising:

a turntable having an abrasive cloth at an upper surface thereof;

a top ring positioned above said turntable for supporting the workpiece to be polished and pressing the workpiece against said abrasive cloth;

a top ring drive shaft coupled to said top ring;

a spherical bearing interposed between said top ring and said top ring drive shaft for allowing said top ring to tilt upon changes in the inclination of said upper surface of said turntable;

at least one first pin mounted on said top ring drive shaft and at least one second pin mounted on said top ring, said first pin and said second pin being held in point contact with each other such that torque from said top ring drive shaft is transmitted to said top ring via said pins; and

damping means provided on at least one of said first pin and said second pin for inhibiting the transmission of vibrations from said top ring drive shaft to said top ring.

6. The polishing apparatus according to claim 5, wherein said damping means comprises an elastic member mounted on at least one of said first pin and said second pin.

7. A polishing apparatus for polishing a surface of a workpiece, comprising:

a turntable having an abrasive cloth at an upper surface thereof;

a top ring positioned above said turntable for supporting the workpiece to be polished and pressing the workpiece against said abrasive cloth;

a top ring drive shaft coupled to said top ring;

a stationary member supporting said top ring drive shaft;

a spherical bearing interposed between said top ring and said top ring drive shaft for allowing said top ring to tilt upon changes in the inclination of said upper surface of said turntable; and

damping means for damping said top ring drive shaft, said damping means being provided between said top ring

drive shaft and said stationary member supporting said top ring drive shaft.

8. The polishing apparatus according to claim 7, and further comprising a radial bearing interposed between said stationary member and said top ring drive shaft, and wherein said damping means comprises an O-ring interposed between said radial bearing and said stationary member.

9. The polishing apparatus according to claim 7, wherein said damping means comprises oil supplying means for supplying oil into a space defined between said top ring drive shaft and said stationary member.

10. The polishing apparatus according to claim 9, and further comprising a radial bearing interposed between said stationary member and said top ring drive shaft, and wherein said space is defined between said radial bearing and said stationary member.

11. The polishing apparatus according to claim 1, and further comprising biasing means for resiliently holding said top ring in a predetermined plane with respect to said top ring drive shaft.

12. A polishing apparatus for polishing a surface of a workpiece, comprising:

- 25 a turntable having an abrasive cloth at an upper surface thereof;
- 25 a top ring positioned above said turntable for supporting the workpiece to be polished and pressing the workpiece against said abrasive cloth;
- 30 a top ring drive shaft coupled to said top ring;
- 30 a spherical bearing interposed between said top ring and said top ring drive shaft for allowing said top ring to tilt upon changes in the inclination of said upper surface of said turntable; and
- 35 a top ring holder movably mounted on said top ring drive shaft, a plurality of retaining members extending through said top ring holder and fixed to said top ring, and a plurality of springs between said top ring holder and said retaining members, said springs resiliently urging said top ring holder against said top ring drive shaft to hold said top ring in a predetermined plane with respect to said top ring drive shaft.
- 40 13. The polishing apparatus according to claim 1, and further comprising a transferring device provided in the vicinity of said turntable for transferring the workpiece to said top ring, said transferring device including holding means for holding said workpiece, and shock absorbing means for resiliently supporting said holding means to suppress the effect of an impact on the workpiece during the transfer process.
- 45 14. The polishing apparatus according to claim 13, wherein the holding means comprise a support member having a suction hole connected to a vacuum source for attracting said workpiece to said support member.
- 50 15. The polishing apparatus according to claim 13, wherein said shock absorbing means comprise a spring for urging said holding means upwardly.
- 55 16. The polishing apparatus according to claim 1, wherein said spherical seats have the same coefficient of friction.
- 60 17. A polishing apparatus for polishing a surface of a workpiece, comprising:
- 60 a turntable having an abrasive cloth at an upper surface thereof;
- 65 a top ring positioned above said turntable for supporting the workpiece to be polished and pressing the workpiece against said abrasive cloth;
- 70 a top ring drive shaft coupled to said top ring;
- 75 a plate interposed between said top ring and said top ring

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drive shaft, said plate having an angular lower projection, at a lower surface thereof, which contacts the upper surface of said top ring, pressure distribution at the lower surface of said top ring being established by the area over which said lower projection contacts said top ring; and

a spherical bearing interposed between said plate and said top ring drive shaft, said spherical bearing comprising spherical seals formed in said plate and in said top ring drive shaft, respectively and a single sphere seated in said seals so as to allow said top ring to tilt upon changes in the inclination of said upper surface of said turntable.

18. The polishing apparatus according to claim 12, wherein said top ring has a plurality of suction holes connected to a vacuum source, whereby the workpiece is attractable to a lower surface of said top ring under a vacuum developed by said vacuum source.

19. The polishing apparatus according to claim 12, wherein said top ring comprises a porous plate connected to a vacuum source, whereby the workpiece is attractable to a lower surface of said porous plate under a vacuum developed by said vacuum source.

20. The polishing apparatus according to claim 12, and further comprising at least one first pin mounted on said top ring drive shaft and at least one second pin mounted on said top ring, said first pin and said second pin being held in point contact with each other such that torque from said top ring drive shaft is transmitted to said top ring via said pins.

21. The polishing apparatus according to claim 1, wherein said turntable has an axis of rotation extending parallel to and spaced from the central longitudinal axis of said top ring drive shaft; and further comprising an abrasive spray nozzle disposed above said turntable and oriented to direct abrasive slurry onto the abrasive cloth at a location spaced radially inwardly of the turntable from the location at which the surface of a workpiece is pressed against the abrasive cloth by said supporting and pressing member.

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22. A polishing apparatus for polishing a surface of a workpiece, comprising:  
a turntable having an abrasive cloth at an upper surface thereof;  
a top ring positioned above said turntable for supporting the workpiece to  
be polished and pressing the workpiece against said abrasive cloth;  
a top ring drive shaft coupled to said top ring;  
a bearing for allowing said top ring to tilt upon changes in the inclination of  
said upper surface of said turntable; and  
a plurality of biasing members rigidly attached to said top ring.

23. A polishing apparatus for polishing a surface of a workpiece, comprising:  
a turntable having an abrasive cloth at an upper surface thereof;  
a top ring positioned above said turntable for supporting the workpiece to  
be polished and pressing the workpiece against said abrasive cloth;  
a top ring drive shaft coupled to said top ring;  
a bearing for allowing said top ring to tilt upon changes in the inclination of  
said upper surface of said turntable; and  
a plurality of biasing members rigidly attached to the periphery of said top  
ring.

24. A polishing apparatus for polishing a surface of a workpiece, comprising:  
a turntable having an abrasive cloth at an upper surface thereof;  
a top ring positioned above said turntable for supporting the workpiece to  
be polished and pressing the workpiece against said abrasive cloth;

a top ring drive shaft coupled to said top ring;  
a bearing for allowing said top ring to tilt upon changes in the inclination of  
said upper surface of said turntable; and  
a plurality of biasing members rigidly attached to said top ring and  
positioned radially with respect to said drive shaft for biasing the periphery of said top  
ring.

25. A polishing apparatus for polishing a surface of a workpiece, comprising:  
a turntable having an abrasive cloth at an upper surface thereof;  
a top ring positioned above said turntable for supporting the workpiece to  
be polished and pressing the workpiece against said abrasive cloth;  
a top ring drive shaft coupled to said top ring;  
a bearing interposed between said top ring and said top ring drive shaft  
for allowing said top ring to tilt upon changes in the inclination of said upper surface of  
said turntable; and  
a plurality of biasing means rigidly attached to said top ring and positioned  
radially with respect to said drive shaft for biasing the periphery of said top ring.

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